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Abstract

PURPOSE: To realize a monomolecular vapor growth on a substrate having openings with different widths by performing alternately a process of supplying a group III element material and hydrogen chloride simultaneously and a process of supplying a group V element material.

CONSTITUTION: A substrate sample 14 having a mask of SiO₂ partially opened is put within a growing chamber 13 and is heated to a predetermined temperature. Then, HCl is supplied over Ga 12 in a growing chamber 11 and GaCl thus produced is supplied together with HCl from a supply tube 18 so that a mixed atmosphere is established within the growing region. The sample 14 is transferred to the growing chamber 11 and exposed to the mixed atmosphere for a predetermined period of time. Then, the sample 14 is returned to the chamber 13 and AsH₃ is supplied to form a GaAs layer in the openings. Thereafter, the chamber 13 is purged of AsH₃. These procedures are repeated to grow the GaAs layer. In this manner, thickness per ALE cycle can be controlled by a unit of monomolecular layer in the selective growth on the substrate having openings with different widths.